

New plant finds in andes foretell of ancient climate change

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For the third time in as many years, glaciologist Lonnie Thompson has returned from an Andean ice field in Peru with samples from beds of ancient plants exposed for the first time in perhaps as much as 6,500 years. In 2002, he first stumbled across some non-fossilized plants exposed by the steadily retreating Quelccaya ice cap. Carbon dating showed that plant material was at least 5,000 years old.

Then in 2004, Thompson found additional plant beds revealed by the continued retreat of the melting ice and when tested, these proved to be carbon-free, suggesting that they might date back more than 50,000 years. If true, that would suggest that the climate in that region may not have been as warm as it is today in more than 500 centuries.

In June, he went back to the ice field and found at least 20 new plant collection sites that had been newly exposed. An analysis of the plant material from these sites suggested that it ranged from 4,500 to 6,500 years old.

Some of these sites contained thick, multiple layers of plant material and soil which might provide a chronology of when in the past this now high, cold, ice-covered locale harbored flourishing wetland bogs, an ecosystem requiring much warmer temperatures.

Thompson, a professor of geological sciences and researcher with the Byrd Polar Research Center at Ohio State , calls that ice cap the "Rosetta Stone" for climate change.

"Quelccaya is the biggest tropical ice cap on earth and is probably the best-documented as far as its response to recent climate change," he said. "And the retreat of the Qori Kalis glacier that spills off Quelccaya is perhaps the best-studied retreat of any tropical glacier."

He should know. He's led 22 expeditions to this forbidding region since 1974, drilling cores through the ice cap that have yielded a detailed climate history of the region. Frozen areas once surrounding Quelccaya now harbor massive meltwater lakes hundreds of feet deep.

This time, Thompson brought with him two botanists to help identify new deposits. Blanca Leon, a research fellow from the Herbarium, Plant Resources Center, and her colleague Kenneth Young, an associate professor of geography, both at the University of Texas at Austin, had identified the plant species in samples from Thompson's earlier expedition.

The plants proved to be alpaca moss, *Distichia muscoides*, a hardy species that still inhabits the region. The researchers also identified at least two additional species of moss and grasses that were recently uncovered by the ice. The 20 plant samples were sent to both Lawrence Livermore National Laboratories and Woods Hole Oceanographic Institute for carbon dating.

Having the botanists along allowed the researchers to confirm that the plants had not been moved by the ice, that they actually once grew where they were found. "It was important that we confirmed that these were original plants on those sites."

Thompson said that the retreating ice was exposing sizeable areas covered by these old plants. "They are perfectly preserved," he said. "We could have collected a boxcar full of them."

The plant discoveries are very significant, Thompson says, not so much because of what the plants are but the fact that so many are being exposed.

Early next year, he plans to return to Tanzania 's Mount Kilimanjaro . In 2001, he predicted that the massive ice field atop that extinct volcano might disappear within 15 years because of rising temperatures. This time, he intends to look for similar plant deposits that might be exposed as the ice retreats. And when he returns to Peru 's Quelccaya ice field next year, he wants to sample more of the exposed beds whose carbon dates suggest are far older than 5,000 years.

"This story could only have been told by having spent 28 years collecting ice cores from around the world, extracting the climate records from them, seeing the global trends emerge and having the opportunity to be there now as the ice released its treasures," Thompson said.

Source: Ohio State University

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